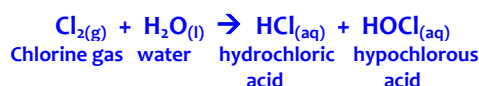


pre – LAB

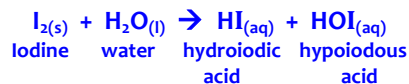
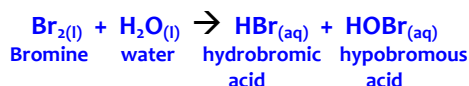
the chemistry of group VII elements (F, Cl, Br, I)

- Pre-labs help you understand and get more from your lab work experience.
- Pre-labs must be completed in your lab notebook before arriving in class to take the lab.

- What is the name given to the group 7 elements? **Halogens**
- What are the states and colours of the **first 4 elements** in this group? **F₂ (g) pale yellow; Cl₂ (g) yellow green; Br₂ (l) orange/brown; I₂ (s) grey/black, dark purple**
- Name each of the following **molecules**: F₂ Cl₂ Br₂ I₂ **fluorine, chlorine, bromine, iodine**
- Name each of the following **ionic compounds**: NaF, NaCl, NaBr, NaI **sodium fluoride, sodium chloride, sodium bromide, sodium iodide**
- What is the difference between a halogen and a halide? **Halogen is the elemental molecule; halide is the ionic form of the halogen. E.g. F₂ compared to F⁻ as in NaF**
- Write a full balanced equation for the reaction that occurs when chlorine gas is bubbled into water. Write the names of the reactants and products under the formulas in the equation.



- Repeat step 6 for bromine and iodine.



- Chlorine is “water soluble” and iodine is not, why? **All the halogens are non-polar molecules and therefore not “soluble” in water (polar). However, the chlorine molecule is much much smaller than the iodine molecule and will, to a small extent dissolve in water. Iodine by comparison will not.**
- Find out what the colour of iodine is when: in water, **yellow-brown**; in a non-polar solvent (e.g. alkane) **violet**; as a solid **grey/black, dark purple**; and in the gas phase **violet**. What is the name given to the change in state from solid to gas? **Sublimation**.
- [Use your text books & periodic table] Fluorine will react with all the halides. Chlorine reacts with bromide and iodide ions but not fluoride ions. Bromine reacts with iodide ions but not fluoride or chloride ions. Iodine will not react with fluoride, chloride or bromide ions. Discern a rule for the trend in reactivity of the halogens with the halides. **A halogen will oxidize (react) with a halide only when it is further down the group than the halogen.**
- Write balanced ionic equations to represent the following reactions: (include state symbols)
 - Fluorine reacting with potassium chloride solution $\text{F}_{2(g)} + \text{Cl}^{-}_{(aq)} \rightarrow \text{Cl}_{2(g)} + 2\text{F}^{-}_{(aq)}$
 - Chlorine reacting with potassium bromide solution $\text{Cl}_{2(g)} + \text{Br}^{-}_{(aq)} \rightarrow \text{Br}_{2(g)} + 2\text{Cl}^{-}_{(aq)}$
 - Iodine reacting with potassium bromide solution **no reaction takes place**
 - Sodium chloride reacting with silver nitrate solution $\text{Ag}^{+}_{(aq)} + \text{Cl}^{-}_{(aq)} \rightarrow \text{AgCl}_{(s)}$ **white***
 - Sodium bromide reacting with silver nitrate solution $\text{Ag}^{+}_{(aq)} + \text{Br}^{-}_{(aq)} \rightarrow \text{AgBr}_{(s)}$ **cream**
 - Sodium iodide reacting with silver nitrate solution $\text{Ag}^{+}_{(aq)} + \text{I}^{-}_{(aq)} \rightarrow \text{AgI}_{(s)}$ **soft yellow**
- Write the colours of the products in the equations written in part 11 d, e & f

* AgCl decolourises (white – purple – black) in sunlight – it is photosensitive